**WE CLAIM:**

**1.** A method for survey design including configuring, and selecting the number of, a plurality of near-surface electrodes connected to the outputs of a source signal generator for transmission of electrical current into the earth in an electroseismic survey of a subsurface formation so as to cause current to penetrate to the depth of interest and produce a seismic response at deployed receivers while providing for substantially reduced noise from near-surface conversions of electromagnetic to seismic energy, said method comprising selecting a technique from the following group:

(a) designing a shallow survey to generate only near-surface electroseismic response of the deep survey, thereby generating a surface noise correction for subtracting, after amplitude normalization, from the seismic response of the deep survey;

(b) positioning at least two electrodes of the same polarity to substantially minimize near-surface electric fields in the vicinity of these electrodes, thereby providing an area of low surface noise;

(c) designing the source transmission and electrode configuration such that the near-surface noise can be distinguished from the deep response in subsequent data processing based on source signature differences;

(d) using an applied magnetic field to modulate the near-surface noise so that it can be distinguished from the deep response in subsequent data processing;

(e) positioning one or more electrically conducting components, said components being unconnected to the signal generator, so as to shield a near-surface region from electric fields generated by the electrodes.

**2.** The method of claim 1, wherein the subtraction/correction technique is selected, and further comprising:

(a) positioning a first and second electrodes a distance apart on or near the surface above the subsurface formation, said distance being close enough to substantially prevent current penetration to depths of interest in the subsurface formation;

(b) positioning a third electrode a distance from the first two electrodes greater than the distance between the first two electrodes, said greater distance being sufficient to cause current to penetrate depths of interest in the subsurface formation;

(c) positioning one or more seismic receivers on or near the surface near the first two electrodes;

(d) providing electrical signal having a waveform across the first two electrodes and measuring the seismic response with the receivers, thereby constituting said shallow survey; and

(e) providing electrical signal having the same waveform across the third electrode and one of the first two electrodes, and measuring the seismic response with the receivers, thereby constituting said deep survey.

**3.** The method of claim 2, wherein all electrodes are substantially horizontal and parallel, the electrodes have polarities at any instant of time such that the negative electrode is to the same side of the positive electrode for each of the two providing electrical signal steps, and the receivers are located to the opposite side of the first two electrodes from the third electrode.

**4.** The method of claim 2, wherein the amplitude normalization is adjusting the amplitudes of the deep survey response and the shallow survey response to be the same for shallow features of the subsurface formation.

**5.** The method of claim 4, wherein all electrodes are substantially horizontal and parallel, the electrodes have polarities at any instant of time such that the negative electrode is to the same side of the positive electrode for each of the two

providing electrical signal steps, and the receivers are located to the opposite side of the first two electrodes from the third electrode.

**6.** The method of claim 1, wherein the subtraction/correction technique is selected, and further comprising:

(a) obtaining a first set of electroseismic data previously generated by positioning a first and second electrodes a distance apart on or near the surface above the subsurface formation, said distance being close enough to substantially prevent current penetration to depths of interest in the subsurface formation, then providing electrical signal having a waveform across the two electrodes and measuring a near-electrode seismic response with the receivers;

(b) obtaining a second set of electroseismic data previously generated by positioning a third electrode a distance from the first two electrodes greater than the distance between the first two electrodes, said greater distance being sufficient to cause current to penetrate depths of interest in the subsurface formation, then providing electrical signal having the same waveform across the third electrode and one of the first two electrodes, and measuring a far-electrode seismic response with the receivers;

(c) adjusting the amplitudes of the two measured seismic responses to be the same for shallow features of the subsurface formation; and

(d) subtracting the response due to the nearer electrodes from the response due to the farther electrodes.

**7.** The method of claim 6, wherein all electrodes were substantially horizontal and parallel, the electrodes had polarities such that the negative electrode was to the same side of the positive electrode for both measurements, and the receivers were located to the opposite side of the first two electrodes from the third electrode.

**8.** The method of claim 1, wherein the technique of minimizing near-surface electric fields by electrode positioning is selected, and further comprising:

(a) positioning a plurality of electrically-connected near electrodes on or near the surface above the formation;

(b) positioning at least one far electrode separated from all the near electrodes by a distance sufficient to cause current to penetrate a depth of interest in the subsurface formation, said far electrodes being electrically connected to each other;

(c) placing one or more seismic receivers in locations central to the near electrodes;

(d) applying an electrical signal between the near electrodes and the far electrodes; and

(e) measuring the seismic response with the one or more receivers.

**9.** The method of claim 8, wherein there are two near electrodes and two far electrodes placed on opposite sides of the near electrodes, and all electrodes are substantially horizontal and parallel.

**10.** The method of claim 8, wherein there are at least four near electrodes oriented substantially vertically in two substantially parallel rows, and two substantially horizontal far electrodes placed on opposite sides of the two rows of near electrodes and substantially parallel to said two rows, said vertical electrodes defining a rectangular surface area of dimensions less than or substantially equal to the vertical electrodes' depth of penetration into the subsurface.

**11.** The method of claim 8, wherein the near electrodes define a closed curve or polygon, and there is a single far electrode oriented substantially horizontally.

**12.** The method of claim 11, wherein the near electrodes are oriented substantially horizontally.

**13.** The method of claim 11, wherein the near electrodes are oriented substantially vertically.

**14.** The method of claim 8, wherein the near electrode spacing is small compared to the subsurface formation's depth of interest and the distance between the at least one far electrode and the near electrodes is approximately equal to said depth of interest.

**15.** The method of claim 8, wherein there are two near electrodes and two far electrodes, said far electrodes being spaced apart substantially the same distance as the near electrodes are spaced apart.

**16.** The method of claim 15, wherein all electrodes are substantially horizontal and parallel, and wherein one near electrode and one far electrode are substantially co-linear, and the other near electrode and far electrode are substantially co-linear.

**17.** The method of claim 8, wherein there are at least four near electrodes and four far electrodes and all electrodes are substantially vertical and penetrating the surface above the subsurface formation and lie substantially symmetrically in two substantially parallel planes with substantially the same number of near electrodes and far electrodes in each plane and substantially the same total number of near and far electrodes.

**18.** The method of claim 8, further comprising adjusting the voltages on the near electrodes to further reduce electric fields in the vicinity of the near electrodes, maintaining all near electrodes at a polarity opposite to the far electrodes.

**19.** The method of claim 1, wherein the technique of modulating the near-surface noise with an applied magnetic field is selected, and further comprising:

(a) positioning two electrodes separated by a distance sufficient to cause current to penetrate the depth of interest;

(b) positioning a substantially horizontal wire loop, on or near the surface in the vicinity of one of the electrodes, said loop being connected to a second electrical signal generator and said loop having dimensions comparable to the depth of said near-surface noise sources; and

(c) modulating the signal applied to the wire loop to apply a magnetic field to the near surface area within the loop.

**20.** The method of claim 19, wherein the electrodes are positioned substantially horizontally and parallel to each other.

**21.** The method of claim 1, wherein the technique of designing the source transmission is selected, and further comprising positioning at least four electrodes substantially in a row, approximately half of the electrodes having positive polarity and the remainder having negative polarity.

**22.** The method of claim 21, wherein the electrodes are positioned substantially horizontally and parallel to each other at substantially equal spacing, alternating positive polarity electrodes with negative polarity electrodes along the row.

**23.** The method of claim 21, further comprising sequentially exciting varying combinations of positive and negative electrodes with a sweep, said sweep providing source signature differences for distinguishing the deep response in data processing.

**24.** The method of claim 21, further comprising exciting selected combinations of electrodes, said combinations being selected to elicit reduced electric field in the vicinity of the receivers.

**25.** The method of claim 1 wherein the technique of minimizing near-surface electric fields by shielding is selected, and wherein the one or more electrically conducting components are selected from the following group: (a) wire; (b) wire mesh; (c) metal foil; (d) well; (e) sheet metal; (f) metal rod.